

mens are placed in Class I. on the south side of the nave, at the extreme west end. Messrs. White have here, too, some beautiful specimens, showing the application of Keene's cement for skirtings and pavements. The liability of this material to scratch in the latter position would have to be considered.

We will not omit to mention here Seeley and Austin's artificial stone, although the example of it which they exhibit in the nave is not one of their best efforts. This material has now been in use many years, and has, we believed, maintained its character for endurance.

Outside the west end of the building will be found, besides illustrations of matters already mentioned, some fine specimens of granite, by the Cheesewring Company, W. and J. Freeman, and R. Hosken. Mr. Freeman's obelisk is 24 feet high; and the Ionic column sent by the Cheesewring Company, is exceedingly well worked. The specimens of coal here,—of that to which England owes so much of her wealth and power,—are full of interest to those who think on what they are looking at. Green's pottery, too, seems excellent.

The French chimney-pieces are not very successful. In one, by Marga (608), metal ornaments are used; and in a second, by Dupuis (184), a spring roller blind is introduced between the mantel and the shelf, to screen the fire when needed. Lehrun has an elegant chimney-piece of Renaissance design, with detached pillars, and one of Gothic fashion, well cut, but in which the nature of panelling is mis-understood. One by Désanges, of bad design (1184), has the peculiarity of a series of painted medallions.

In the Austrian department, in a glass case, will be found a collection of very excellent bricks and tiles. These articles are exhibited by M. Alois Miesbach, who, besides five brick manufactories in Lower Austria, and one at the celebrated Rakos, near Pesth, owns the brick works at Juxeradorf, said to be the largest in the world. This privileged brick and tile factory stands on the Wiener-Berg, covering a space of ground of 26½ English acres. "The materials for brick-making are drawn from an area of 690 69-100 English acres, divided into four sections, which are separated into ten sub-divisions. There are 24,930 feet in length of drying sheds for the manufactory of ordinary bricks, and 8,304 feet of moulding sheds for the manufacture of tiles, facing bricks, and ornamental bricks, besides five artesian wells, a drain 2,160 feet long, forty-three kilns calculated to burn 45,000 to 110,000 bricks per kiln, or to burn at one time 3,510,000 bricks. There are further in this establishment infant schools for 120 children, a hospital for fifty-two beds, besides a tool workshop, a wheelwright's and carpenter's shop, and also the great watering and kneading pits for red and white ornamental bricks. On all the sections there are the requisite dwellings for the officials and workmen, besides the carmen's stabling for about 300 horses. Lastly, there are eight places for cooking and selling liquor. The six other brick factories are provided in the same proportion, and the amount of money turned over in all the brick business amounts to about 1,800,000 florins C. M., and the capital employed to 600,000 florins C. M. The annual production of bricks and tiles reaches

107,150,090, and 4,380 persons are employed in their manufactory."

From Belgium there are also some good bricks.

In the French machinery-department there is a machine for making hollow bricks worth examination. Each brick is divided internally by three upright and three horizontal partitions into sixteen cells.

The retorts in the French department cannot be compared with those we have mentioned amongst the English.

Messrs. Virebent exhibit some very beautiful specimens of artificial stone, which will be found on the south side of the nave. These are equal to anything of the sort in the collection.

In Switzerland there is a terra-cotta font not without merit.

Amongst the foreign mineral manufactures we should notice the chimney-pieces, chairs, doors, &c., of malachite and metal exhibited in the Russian department, which show the affluence in Russia of a material regarded by us as rare. The art shown in these works is not of a high order: the labour expended on them has been very great. The folding-doors, for example, occupied, we are told, sixty men for a whole year. The pieces of malachite are put together so skilfully, that the joints are scarcely discoverable.*

Enough, however, for the present.

ON VENTILATION BY THE PARLOUR FIRE.†

THE term Ventilation does not strictly imply what we intend by its use in reference to buildings used as dwelling-houses, or otherwise for the occupation of breathing creatures. To ventilate is defined "to fan with wind;" but one of the main objects for which houses and other enclosed buildings are made is shelter from the wind. Inasmuch, however, as the wind is but air in motion, and we can only live in air, air may not be shut out of our houses, though, for comfort's sake, we refuse to admit it in the active state of wind. But in doing this,—in shutting out the wind,—we are apt to put ourselves upon a short allowance of air, and to eke out the short allowance by using the same air over and over again.

There is a broad line of distinction, indeed, to be drawn between in-door and out-door ventilation; for although the principles upon which nature proceeds are the same, the operation is influenced by the circumstances under which the process may be carried on. Whether it be on the hill-side, open to the winds of heaven, or in a close room from which all draught of air is excluded, the expired breath, as it leaves the nostrils heated by the fire in the lungs, rises, or seeks to rise, above their level, and may not be again inhaled. Out of doors the cooler or less heated air of the lower level presents itself for respiration unaffected by the spent exhaled air, but in a close apartment the whole body of included air must soon be affected by whatever process any portion of it may have undergone. The process by which Nature carries off spent air, purifies, and returns it uncontaminated, is thus checked by the circumstances under which we place ourselves within-doors. All our devices for shelter from the weather, and for domestic convenience and comfort, tend to prevent the process provided by Nature from taking effect according to the intention in that respect of the Creator. We not only confine ourselves, indeed, and pen up air in low and close rooms, but we introduce fire by which to warm the enclosed air: wanting light within our dwellings when daylight fails, we introduce another sharer in the pent-up air of our rooms, being fire indeed, in another

form, but generally under such circumstances, that it not only abstracts from the quantity, but injures the quality of what may remain. But fire, whether in the animal system, in the grate, or in the lamp, cannot long endure the imagined limitation of air. There must be access of air—of vital air—by some channel or other, or the fire will go out.

An open fire in the grate must, however, have a vent for some of its results, or it will be so disagreeable a companion that its presence could not be endured, even so long as the most limited quantity of air would last; and the fire will compel the descent of air by the vent commonly supplied under the name of a flue—a chimney flue—to render its presence tolerable in a closed room, if a supply be not otherwise obtainable. But as the outer air at the higher level of the top of a chimney, because of the rarity of the air in and above the flue, responds to the demand of the fire less easily than the lower air, or that at and about the level of the fire; and the lower air, or air at the lower levels, forces its way in, therefore, by any opening it can find or make—through the joints of the flooring boards and under the skirtings—the supply passing first up or down the hollow lathed and plastered partitions, sometimes even up from the drains and through the joints under and about the doors and windows; if these channels do not exist, as they may not when the joiners' work and the plastering are good, or when the open joints referred to are stopped up by any means,—the fire smokes, and every known means of curing the chimney failing, means are sought of obtaining heat without the offending fire. Ventilation is not thought of yet.

The open fire may be made to give place to the close stove or to hot air pipes, to hot water pipes, or to steam pipes—which make hot the air about them in a close room without causing draughts. But the warmth obtained in pipes, is costly under any circumstances. Air does not take up heat freely, unless it be driven and made to pass freely over the heated surface; and there being little or no draught in connexion with heated bodies, such as close stoves and hot pipes, the heat from them is not freely diffused, and is not wholesome. There is, with all the expense, no ventilation.

Stoves and hot pipes are, moreover, exceedingly dangerous inmates in respect of fire. Such things are the most frequent causes, directly or indirectly, of fires in buildings. Placed upon, or laid among or about the timbers and other wood-work of hollow floors and hollow partitions, and in houses with wooden stairs, more conflagrations are occasioned by hot pipes and stoves, than by any thing else, and perhaps more than by all other things together.

Open stoves with in-draught of air warmed by being drawn quickly (when it is drawn quickly) overheated surfaces may be made part of a system of safe and wholesome in-door ventilation; but to be perfect there must be also out-draught with power to compel the exit of spent or otherwise unwholesome air. But the arrangements for and connected with such stoves are special, and therefore costly, unless the buildings in which they may be employed have been adapted in building to receive them. An in-draught stove may however be applied with great advantage as it regards the general warmth and ventilation, in the lowest story of any house, if there be compelled out-draught at the highest level to which it will naturally direct itself if it be not retained, so that the in-draughted air, tempered as it enters, may be drawn out as it becomes spent, or otherwise contaminated.

But this must be considered in all endeavours to effect in-door ventilation, or the endeavour will fail. The air must be acted upon, and not be left, or be expected, to act of itself, and to pass in or out as may be desired, merely because ways of ingress and egress are made for it. Make a fire in a room, or apply an air-pump to the room, and the outer air will respond to the power exerted by either by any course that may be open to it, and supply the place of that which may be consumed or ejected; but open a win-

* The Russian parquetry for floors is very excellent.

† Read by Professor Hosking at the Royal Institution of Great Britain, May 23.